UNIVERSIDADE FEDERAL DE GOIÁS
INSTITUTO DE CIÊNCIAS BIOLÓGICAS
PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS BIOLÓGICAS

# Work Plan – 2025/02

## I. IDENTIFICATION

| | | | |
|---|---|---|---|
| **Course:** | **GRADUATE PROGRAM IN BIOLOGICAL SCIENCES** | | |
| **Discipline:** | **Methods in Cell and Tissue Biology** | | |
| **Professor:** | **Prof. Manoel Francisco Biancardi (coordinator)** | | |
| **Other professors:** | **Dr. Janaína Ribeiro Costa (colaborator)** | | |
| **Semester:** | **2025.2** | | |
| **Theoretical workload:** | 12h | **Practical workload**: | 48h |
| **Language of the discipline** | ( )Portuguese (X)English ( )Spanish<br>Obs:_____ | | |
| **Modalities of the discipline** | ( )Virtual (X)Presential ( )Virtual and Presential | | |
| | ( )Synchronous ( )Assynchronous ( ) Synchronous and Assynchronous | | |

## II. SUMMARY

Introduction to methodology for cell and tissue studies. Cytochemistry principles. Principles of photonic microscopy. Preparation of solutions, stains, and fixatives. Methods of collecting and fixation of biological samples. Methods of impregnation, and paraplast and plastic resin embedding. Microtomy. Cytochemistry methods. Methods in immunohistochemistry. Obtaining, analysis and interpretation of photomicrographs. Morphometrical and stereological analysis.

## III. GENERAL AIM

To teach the theoretical and practical principles that will guide the methods in cell and tissue biology, besides the application of these concepts in scientific research.

## IV. SPECIFIC AIMS

1) Learning of basic principles related to the processing of biological samples
2) Learning of basic principles of cytochemical reactions
3) Learning of theoretical and practical principles of immunohistochemistry
4) Learning of theoretical and practical principles of immunofluorescence
5) Learning of basic principles on morphology and stereology
6) Debating about the applicability of histological techniques in basic and applied science

## V. CONTENT

1) Histological processing
2) Cytochemistry reactions
3) Immunohistochemistry
4) Immunofluorescence
5) Morphometry
6) Stereology
7) Basic notions of statistics applied to scientific research
8) Applicability of histological techniques in basic and applied science

## VI. METHODOLOGY

The classes will be exclusively in person. If necessary, some theoretical classes may be delivered virtually. Theoretical classes will be held in room 225 or 221, ICB 4. Practical classes will be held at the Microscopy Laboratory Applied to Reproduction (LaMARe), ICB 3, first floor.

## VII. PROCESSES AND CRITERIA OF EVALUATION AND EVALUATION'S TIMELINE

The exams will be based on students participation during the classes (theoretical and practical), and in the scientific report related to the content worked in the discipline. Following you will find both activities necessary to calculate the final grade.

**G1** = participation during the classes (theoretical and practical)
**G2** = Final report**

**Final grade** = (**G1** + **G2**)/2 (simple arithmetic mean)

** The **final report** will be based on the results produced from the biological samples, and all the methodologies used during the course. Following you will find the topics that must be present in the final report: Cover containing the title and the authors' names; Abstract; Introduction, Material and Methods; Results and Discussion; References. **Keep in mind that all presentations will be in the English language**.
Every two students (group) must share the same biological sample. In case the student does not have a biological sample, the professor will provide it allowing the student to participate of the discipline.

## VIII. TIMELINE *

| Dates | Content/Activity | References |
|---|---|---|
| 09/09/25 | **Presentation of the discipline/work plan**<br><br>**Theoretical class: Methods in cell and tissue biology**<br>Morning: 08:00 am to 12:00 pm | Work plan; Ref. 1 to Ref. 4 |
| 09/10/25 | **Practical class: Collecting and processing of biological samples**<br>Morning: 08:00 am to 12:00 pm – Afternoon: 14:00 pm to 18:00 pm | Ref. 1 to Ref. 4, and practical classes |
| 09/16/25 | **Practical class: Microtomy**<br>Morning: 08:00 am to 12:00 pm – Afternoon: 14:00 pm to 18:00 pm | Ref. 1 to Ref. 4, and practical classes |
| 09/17/25 | **Practical class: Cytochemistry**<br>Morning: 08:00 am to 12:00 pm – Afternoon: 14:00 pm to 18:00 pm | Ref. 1 to Ref. 4, and practical classes |
| 09/23/25 | **Theoretical class: Microscopy, morphometry, and photodocumentation** – Morning: 08:00 am to 12:00 pm<br><br>**Practical class: Photodocumentation** –Afternoon: 14:00 pm to 18:00 pm | Ref. 1 to Ref. 9, and practical classes |
| 09/24/25 | **Practical class: Photodocumentation**<br>Morning: 08:00 am to 12:00 pm – Afternoon: 14:00 pm to 18:00 pm | Ref. 1 to Ref. 4, and practical classes |
| 10/01/25 | **Theoretical class: Immunohistochemistry and immunofluorescence**<br>Morning: 08:00 am to 12:00 pm<br>**Practical class: Immunohistochemistry and immunofluorescence**<br>Afternoon: 14:00 pm to 18:00 pm | Ref. 1 to Ref. 4, and practical classes |
| 10/07/25 | **Presentation of the scientific reports (Final reports)**<br>Morning: 08:00 am to 12:00 pm – Afternoon: 14:00 pm to 18:00 pm | Ref. 1 to Ref. 9, and practical classes |
| 10/08/22 | **Closing of the discipline and grade releasing**<br>Morning: 08:00 am to 12:00 pm | --- |

* The timeline may be changed by the professor if necessary.

## IX. REFERENCES

1) **Basic**

**Ref. 1 -** Ribeiro, Ciro Alberto de Oliveira; Reis Filho, Herculano Salviano; Grötzner, Sonia Regina. **Técnicas e métodos para utilização prática em microscopia**. 1ª ed., Santos Editora, Santos, São Paulo, 2012.

**Ref. 2 -** Carvalho, Hernandes Faustino; Recco-Pimentel, Shirlei Maria. **A célula**. 3ª ed., Editora Manole Ltda, Barueri, São Paulo, 2013.

2) **Complementary**

**Ref. 3 -** Carneiro, José; Junqueira, Luiz Carlos Uchoa. **Histologia básica**. 12ª ed., Editora Guanabara Koogan, Rio de Janeiro, 2017.

**Ref. 4 -** Ross, Michael H; Pawlina, Wojciech**. Histologia - texto e atlas: em correlação com Biologia**

**Celular e Molecular**. 7ª ed., Editora Guanabara Koogan, Rio de Janeiro, 2016.

**Ref. 5 -** S.R. Taboga, A.B. Santos, A.G.R. Gonzatti, B.C. Vidal, M.L. Mello. **Nuclear phenotypes and morphometry of human secretory prostate cells: a comparative study of benign and malignant lesions in Brazilian patients**. Caryologia 3 (2003) 15-322.

**Ref. 6 -** L.A. Manso, B.C.M. Medeiros, G.A. Rodrigues, J.G. Ramos, M.R. Marques, S.R. Taboga, F.C.A. Santos, M.F. Biancardi. **Testosterone exposure in prenatal life disrupts epithelial nuclear morphology, smooth muscle layer pattern, and FGF10 and Shh expression in prostate**. Life Sciences 2021, Online ahead of print.

**Ref. 7 -** L.J. Gomes, G.A. Rodrigues, B.C.M. Medeiros**,** L.A. Manso, J.G. Ramos, P.V. de Azevedo Brito, S.R. Taboga, H.F. de Carvalho, F.C.A. dos Santos, M.F Biancardi. **The influence of pregnancy on female prostate morphophysiology in gerbils (*Meriones unguiculatus*)**. Reproductive Sciences 2021, Online ahead of print.

**Ref. 8 -** R.W. Veltri, C.S. Christudass, S. Isharwal**. Nuclear morphometry, nucleomics and prostate cancer progression**. Asian J. Androl. 14 (2012) 375-384.

**Ref. 9 –** Moore, David S. A estatística básica e sua prática. 5ª ed., Editora LTC, Rio de Janeiro, 2011.

## X. PLACE OF RESULTS RELEASING

The final grade will be released through the SIGAA.

## XI. OBSERVATIONS

None.